

U. S. Patent Application of Henry Kozlowski  
*Attorney Docket No. 6726-01*

**WATER TREATMENT ASSEMBLY**

"EXPRESS MAIL" MAILING LABEL

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## **WATER TREATMENT ASSEMBLY**

### **Cross-Reference to Related Applications**

This application is related to and claims priority to U.S. provisional application entitled "WATER TREATMENT ASSEMBLY" having serial number 60/239,839, by Henry Kozlowski, filed October 12, 2000 and incorporated by reference herein. This application is related to and claims priority to Canadian application entitled "WATER TREATMENT ASSEMBLY" having serial number 2,323,299, by Henry Kozlowski, filed October 12, 2000 and incorporated by reference herein. This application is related to and claims priority to U.S. provisional application entitled "DISCHARGE LAMPS" having serial number 60/301,999, by Henry Kozlowski, filed June 29, 2001 and incorporated by reference herein.

### **Field of the Invention**

The present invention relates to assemblies for the purification or disinfection of fluid, especially water, using ultraviolet light, and particularly to operating a ballast in excess of 50 kHz in such assemblies.

### **Background to the Invention**

It is well known to treat water, particularly wastewater, with ultraviolet light in order to effect a purification or disinfection of the water so that it is suitable for discharge into a lake, river or stream or so that the water is potable water and suitable for consumption.

Ultraviolet treatment systems use lamps with ballast modules to produce the ultraviolet (UV) light. The ultraviolet systems for wastewater typically have a plurality of elongated ultraviolet lamps arranged in a parallel space-apart relationship and they are supported in a frame. Racks of ultraviolet lamps in a frame are typically placed in a channel through which the water is passed. The lamps are located underwater. The lamps are enclosed in a sheath typically formed of quartz. A ballast module will typically operate more than one lamp. Depending upon the flow rate, the number of ballast

modules in an ultraviolet treatment system may vary from one to tens of thousands.

The Ballast modules produce heat during use, regardless of whether they have an electronic or older core-coil style ballast. Thus, the cooling of the ballast is important to the operation of the system, as the higher the operating temperature of the ballast, the shorter the lifetime of the ballast. The dissipation of heat from the ballast is a major consideration when ultraviolet treatment systems are used for the disinfection of water and wastewater.

A variety of methods may be used to dissipate the heat. For example, the heat from the ballast may be dissipated using fans, or an air conditioner may be attached to the system. In some instances, the ultraviolet treatment systems may be placed in air-conditioned buildings. Cooling lines may be passed through containers holding the ballast. Air conditioners and cooling systems are costly to operate.

Alternatively, the ballast may be placed on top of the frame containing the ultraviolet lamps, to spread out the positioning of the ballast modules and to facilitate dissipation of heat. However, in hot climates and areas with a lot of sunlight, ballast modules that are placed on the top of the ultraviolet lamp frames may overheat, and buildings with air conditioners or sun shields may be required. Filters on fans or air conditioners used in the cooling of ballast modules are very susceptible to the accumulation of insects and dust, which tend to plug the filters and restrict the flow of air through the filters.

Consequently, the ballast modules tend to overheat. To prevent overheating, costly monitoring systems, maintenance and backup ultraviolet treatment systems are required.

Wastewater treatment plants are usually built in low-lying areas, to reduce the cost of pumping of sewage to higher elevations. The treated wastewater is often emptied into a body of water e.g. a lake or river. Thus, in some instances, the ultraviolet treatment plant may be on a flood plain, and subjected to periodic flooding as a result of the location of the plant. It may, therefore, be necessary to seek to waterproof the ultraviolet treatment system